

Sub A1

WE CLAIM:

1. **A thermal transfer roller, comprising:**
an outer shell, an inner shell, and an annulus between the outer and inner shells;
at least a first end chamber in fluid communication with the annulus;
a roller journal in communication with the annulus; and
Fig. 1 a plurality of channels in the first end chamber, each channel having a first end closer to the roller journal and a second end closer to the annulus;
wherein the second end of each channel is wider than the first end of the channel.

- Sub C2*
2. **The thermal transfer roller of Claim 1, further comprising:**
a second end chamber in fluid communication with the annulus;
a fluid outlet channel in communication with the second end chamber;
and
a plurality of channels in the second end chamber, each channel having a first end closer to the annulus and a second end closer to the fluid outlet channel;
wherein the first end of each channel is wider than the second end of the channel.

3. **The thermal transfer roller of Claim 1, wherein the first end chamber comprises a plurality of radially extending walls defining the channels.**

4. The thermal transfer roller of Claim 1, wherein the first end chamber comprises an insert including a plurality of baffles defining the channels.

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5. The thermal transfer roller of Claim 1, wherein the first end chamber comprises at least about 10 of the channels.

6. The thermal transfer roller of Claim 1, wherein the first end chamber comprises at least about 20 of the channels.

7. The thermal transfer roller of Claim 1, wherein the first end chamber comprises at least about 30 of the channels.

8. The thermal transfer roller of Claim 2, wherein the second end chamber comprises a plurality of radially extending walls.

9. The thermal transfer roller of Claim 2, wherein the second end chamber comprises an insert including a plurality of baffles.

10. The thermal transfer roller of Claim 2, wherein the second end chamber comprises at least about 10 of the channels.

11. The thermal transfer roller of Claim 2, wherein the second end chamber comprises at least about 20 of the channels.

12. The thermal transfer roller of Claim 2, wherein the second end chamber comprises at least about 30 of the channels.

13. The thermal transfer roller of Claim 1, wherein the annulus comprises at least one spiral channel.

Sub A3
14. A thermal transfer roller, comprising:

an outer shell, an inner shell, and an annulus between the outer and inner shells;

an inlet end chamber in communication with the annulus;

a plurality of channels in the inlet end chamber, each having a wider end closer to the annulus and a narrower end further away from the annulus;

an outlet end chamber in communication with the annulus; and

a plurality of channels in the outlet end chamber, each having a wider end closer to the annulus and a narrower end further away from the annulus.

15. The thermal transfer roller of Claim 14, comprising at least 10 of the channels in each end chamber.

16. The thermal transfer roller of Claim 14, comprising at least 20 of the channels in each end chamber.

17. The thermal transfer roller of Claim 14, comprising at least 30 of the channels in each end chamber.

18. The thermal transfer roller of Claim 14, comprising radially extending walls in each end chamber which define the channels.

19. The thermal transfer roller of Claim 14, comprising a baffle insert in each end chamber, defining the channels.

Sub A3

20. A thermal transfer roller, comprising:

- a first end chamber in communication with a source of fluid;
- an annulus in communication with the first end chamber; and
- a plurality of channels in the first end chamber, each channel having a wider end closer to the annulus, and a narrower end.

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21. The thermal transfer roller of Claim 20, further comprising:

- a second end chamber in communication with the annulus; and
- a plurality of channels in the second end chamber, each channel having a wider end closer to the annulus, and a narrower end.

22. A roller assembly comprising the thermal transfer roller of Claim 20, and a second roller.

23. A roller assembly comprising at least two thermal transfer rollers of Claim 20.

24. A roller assembly comprising the thermal transfer roller of Claim 21, and a second roller.

25. A roller assembly comprising at least two thermal transfer rollers of Claim 21.